

TITLE OF THE INVENTION

*Disintegrator Roll Housing for an Open-End
Spinning Apparatus, Insert for a Disintegrator roll housing and
a Procedure for the Modernization of Spinning Apparatuses*

FIELD OF THE INVENTION

The present invention concerns a disintegrator roll housing, whereby an insert is placed in an area, following the feed entry of the band as seen in the direction of rotation of the disintegrating drive shaft ~~in accord with the principal concept of claim 1, as well as concerning an insert for a disintegrator roll housing in accord with claim 4 and further concerns a procedure for the modernization of an open-end spinning apparatus, whereby an insert of the disintegrator roll housing can be removed and subsequently replaced by an insert in accord with the invention as claimed in claim 15.~~ BACKGROUND OF THE INVENTION

Disintegrator roll housings are known in multitudinous designs within the state of the technology, including the spinning units SE7, SE8 and SE9 of a rotor based spinning machine "Autocoro" of W. Schlafhorst AG & Co., 41061 Mönchengladbach, DE. The disintegrator roll housings of these spinning units consist essentially of individual segments, which are placed on a carrier plate. The individual segments, which are set on this carrier plate, thus form the circumferential wall of the distintegrator housing, particularly in the zone between the fiber band feed equipment and the contamination separation opening of the disintegrator roll housing.

This type of construction of a disintegrator roll housing brings with it the disadvantage, that, following the entry of the fiber band by a suction condition, which suction extends itself from the housing of the rotor to that of the disintegrator, a large volume of air is pulled in. That air, which is induced particularly in the area of the contamination separation opening, can only be controlled as to quantity by regulation of the suction of the spinning chamber. This apparatus has, however, the general disadvantage, that in reference to the actually required air, excessive air is continually fed into the disintegrator roll housing. The result of this is that the incoming air itself can lead to difficulties within the disintegrator roll housing. Large cross-sectional openings in the area of the air flow entering the disintegrator roll housing do not yield optimal contamination combing-out and removal conditions. Such excess air leads, for example, to entrained particle dissipation, since the air exits from the disintegrator roll housing in an uncontrolled manner and carries with it fibers, which aggregate in the area of the

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spinning machine. This action results in disturbances in the operation of the ~~said~~ machine.

An unpublished application DE 102 24 589.4 describes a disintegrator roll housing, wherein the circumferentially disposed wall of the ~~said~~ disintegrator roll housing is formed by an exchangeable insert placed between the contamination separation inlet and the exit opening for fibers. Thereby, it is intended that the contamination removal can be effected and made adaptable to various fibers. The disintegrator roll housings in accord with the state of the technology have the disadvantage, that the contamination separation can vary as to quantity, however, the known inserts are not designed to bring about a conformation of the disintegrator roll housings to the varying loads. The result of this is, that the known disintegrator roll housings cannot be made to suit different fiber materials and other spinning conditions. Further, with the conventional segments, the zone of the contamination separation is not ~~so~~ designed, that the disintegrator rolls are covered, particularly about their edges. Moreover, the size of the contamination separation openings can be changed only insufficiently to meet optimal requirements, and especially the location of ~~said~~ openings in relation to the fiber feed (feed opening in the disintegrator roll housing) cannot be altered.

SUMMARY OF THE INVENTION

Thus, the purpose of the present invention is to propose a disintegrator roll housing, which avoids the disadvantages of the state of the technology, as well as to propose an insert, which has the capability of adjusting the disintegrator roll housing during the operation of the disintegrator under different spinning conditions. A further purpose of the present invention is to propose a procedure to modernize the open-end spinning apparatuses, which now adhere to the state of the technology. <†

The present purpose, in accord with the invention, is to be achieved by a disintegrator roll housing having the features of claim 1. By the use of an invented insert in accord with Fig. 4, a disintegrator roll housing, in a simple way, can be made to accommodate itself to various spinning conditions. Further, a disintegrator roll housing now in accord with the state of the technology can be modernized by means of the procedure of the invented procedure.

* Various features and advantages of the invention will be set forth in part in the following description, or may be obvious from the description, or may be learned through practice of the invention.

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The achievement of the invention is such that, the disintegrator roll housing can be so designed, that, in accord with the invention, the input of air into the disintegrator roll housing can be better controlled and further, the position of the inlet on the disintegrator roll housing where the air intake takes place is similarly optimized. Likewise, the air content within the disintegrator roll housing can be essentially improved with the said control and positioning. An additional advantage arises, in that, with the aid of the invention, existing slots between the disintegrator roll housing and the associated rolls, even in the area of the contamination separation inlet, can be blocked, so that an agglomeration of fibers at the said slots can be avoided.

The invented insert has the advantage, that it fulfills the function of the circumferential wall of the disintegrator roll housing, especially in the area of the contamination separation inlet, so that, even here, the edges of the disintegrator roll are covered, whereby, as to the circumferential wall of the disintegrator roll housing, only the part of the disintegrating roll is exposed, which is equipped with a processing surface. Advantageously, the disintegrator roll housing, following (in the direction of rotation of the disintegrator shaft) the contamination separation opening possesses an abutment for the said insert, so that the insert can be positioned in that area, where it comes into contact with the remaining components of the disintegrator roll housing.

In a particularly advantageous design, the disintegrator roll housing, in the area of the contamination separation inlet, possesses a lateral limitation, while the oppositely situated limitation of the contamination separation inlet is constructed at the insert. In this way, it becomes possible to exchange the insert, or to reset it anew, in the disintegrator roll housing, particularly in the axial direction of the roll. This permits an advantageous opening between the insert and the disintegrator roll housing.

The lengthening of the combing-out zone for the fiber band is advantageously achieved by a design of the fiber band support at the insert, whereby a joining of the fiber band feed to the disintegrator roll housing is carried out so that upon the disintegration of the fiber band, the quantity of contaminant is separated, and fiber is improved in its quality, that is to say, that fewer good fibers (in excess of 10 mm) are expelled, while the ejection of lighter contaminant is not adversely affected.

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By the diminishing of the cross-sectional opening of the air intake at the suction point in the area of the contaminant separation, the velocity of the airflow is increased, which leads to a corresponding diminishing of the loss of good fibers. In this way, it is possible to disintegrate even fiber bands comprised of reclaimed material, which possess a high short fiber content and to work the corresponding fibers into yarns of high quality value.

By means of the invented design of the insert with at least one forked projection arrangement, the achievement attained is that, the circumferential wall of the disintegrator roll housing in the area of the contaminant separation opening can be constructed with the aid of the invented insert. By the formation of the forked insert, at the same time, the size of the contaminant separation agrees exactly in its width with the width of the active surface of the disintegration roll. In this way, the insert can possess two forklike projections, so that the left and the right limitation of the contaminant separation opening is formed by the said insert.

In an additional advantageous design of the invention, the insert incorporates the contaminant separation opening, whereby even the area following the contaminant separation opening ("after" as seen in the direction of the motion of the fibers) can be located on the insert itself. This enables that even this area, for example, in the form of coatings or other geometrical formations can be optimally adapted to various spinning conditions. The area after the contamination separation suffers high abrasion, due to many types of fibers, so that an abrasive wear in this area need not lead to a situation in which the entire disintegration roll housing needs to be replaced. In accord with the invention, it would be sufficient simply to make a replacement with a new insert into the disintegrator roll housing.

In an especially advantageous development of the invention, the insert possesses in the area of the air inlet at the contamination separation opening (rounded off edges) in order that the flow of incoming air, which occurs in this area, is assured of undisturbed flow in the greatest possible manner. It is particularly advantageous, if the insert is placed on the disintegrator roll housing with a capability of being exchanged, especially where fastening means are concerned.

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The fastening means, for example, are in the form of bolt borings or the like. By means of the design, wherein the insert in the area of the contamination separation covers the edges of the disintegrator roll, the advantageous achievement is, that no fibers can migrate in this area too far outside of the surface prepared roll. In the case of a favorable formation, the forklike projections impinge on an abutment, whereby they lie on the disintegrator roll housing. In this way, an exact positioning of the insert is possible.

An achievement of the invented procedure is that an open-end spinning apparatus conforming to the state of the technology can be reworked in such a manner, that the said apparatus can be modernized so that it remains within the state of the technology, but at the same time, in the area of the contaminant separation, possesses a controllable air inflow, as it does in the area following the feed of the fiber band. Simultaneously, it is possible to bring about positive effects on the quantity of the contaminant separation, where the circumferential wall of the disintegrator roll housing is concerned, both before and after the contamination separation opening, ^{both before and after} ~~the contamination separation opening~~ ^{both before and after} ~~the contamination separation opening~~ ^{O.K.}. Further advantageous embodiments of the invention are described in the subordinate claims or alternate independent claims.

The present invention is more completely explained with the aid of drawings.

There is shown in BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a sectional presentation in profile of an invented disintegrator roll housing having an inset in accord with the invention.

Fig. 2 shows a top view of the insert of Fig. 1; and

Fig. 3 shows a top view of an alternatively formed insert in accord with the invention.

DETAILED DESCRIPTION

The sectional view of Fig. 1 illustrates a profile view of the invented disintegrator roll housing with an invented insert, wherein the disintegrator roll is absent from its casing. For the mounting of the disintegrator roll, the disintegrator roll housing 1 has a round opening 14, through which passes, in operational conditions, a shaft, upon which the disintegrator roll is fastened. The disintegrator roll housing 1 has a feed opening 2 through which the fiber band (not shown), which is to be disintegrated, is transported into the disintegrator casing 1 with the help of a feeding shaft 15. The feeding shaft 15

** Reference will now be made in detail to the presently preferred embodiments of the invention, one or more examples of which are shown in the figures. Each example is provided to explain the invention, and not as a limitation of the invention. In fact, features illustrated or described as part of one embodiment can be used with another embodiment to yield still a further embodiment. It is intended that the present invention cover such modifications and variations.

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operates in a conventional manner, coactively functioning with a charging trough 16. The charging trough 16 confines the fiber band between itself and the feed shaft 15 by means of elastic elements 17, so that between the fiber band and the feed shaft no slippage occurs and the fiber band can be controllably fed into the disintegrator roll housing 1.

For the lateral guidance of the fiber band in the area of the charging trough 16, this said trough 16 possesses two limiting sides 161, through which the fiber band is guided in the area of the charging trough 16, as seen in the axial direction of the feed shaft 15. The direction of rotation of the disintegrator roll is designated by the arrow P. After the area of the limiting sides 161, the charging trough 16 connects to a still another fiber band support 162, which, in this area likewise forms a part of the circumferential wall 11 of the disintegrator roll housing 1. As seen in the direction of rotation P, following the charging trough 16, the invented insert 5 is connected, which will be discussed later. In accord with each formation of the charging trough 16, it is possible, at least partially, that the insert 5 can also include the fiber band support 162.

After the insert 5, in the circumferential direction of the arrow P, the disintegrator roll housing 1 has in addition a circumferential wall 11, which finally transforms into an exit opening 3, through which, in a known manner, the disengaged fibers are ejected from the disintegrator roll housing 1, wherein the said fibers are conducted to spinning mechanism organ, for example, an open-end spinning apparatus. The exit opening 3 connects into a fiber feed conduit 31. Following the exit opening 3, as seen in the direction of rotation P of the disintegrator roll, the disintegrator roll housing 1 is equipped with the circumferential wall 11, which extends as far as the band feed opening 2.

The insert 5, which is located between the charging trough 16 and an abutment 41 of the disintegrator roll housing 1, is exchangeably attached onto the side wall 18 of the disintegrator roll housing 1 by fasteners 6, which may be bolts or through-pins. In the area between the charging trough 16 and insert 5, there is to be found a small streamlined slot in the circumferential wall 11 of the disintegrator roll housing 1, the cross-section of which is regulated by the necessary moveability of the charging trough 16.

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The contaminant separation opening 4 extends itself, as seen circumferentially, between the contamination separation wall 42 and the limiting wall 43. This extent is indicated by the lines 44. Between the two (separate) lines 44, which represent the length of the contamination separation wall 42 as well as that of the limiting wall 43, the insert 5 possesses the lateral border 12, which limits the extent of the contamination separation opening 4 in the axial direction, back to the side wall 18. Between the side limitation 12 and the opposite limitation 13 (see Fig. 2) as well as between the lines 44, is to be found the contamination separation opening 4.

Thus, the contamination separation opening 4, in the embodiment of Fig. 1, is designed as an opening in the insert 5, since the insert 5, both in its circumferential direction as well as in its axial direction, extends itself beyond the contamination separation opening 4 and, to a certain extent, also comprises part of the circumferential wall 11 of the disintegrator roll housing 1. In the direction of the arrow P, and after the contamination separation opening 4, the insert 5 ~~abuts~~ ^{possesses} with a contact surface 53, which, in the embodiment shown in Figs 1, 2 is not interrupted in the axial direction. This contact surface 53 strikes the abutment 41 of the disintegrator roll housing 1.

Upon an exchange of the insert 5, it is also possible that a determination can be made of both the size of the contamination separation opening 4 as well as its position in the circumferential direction of the circumferential wall 11 of the disintegrator roll housing 1, since the contamination separation opening 4 is an integral component of the insert 5. Principally, because ~~of~~ the formation of the disintegrator roll housing 1, that is to say, its circumferential wall 11, determines the beginning of the insert 5 in the area of the charging trough 16, ^{the} The length of ~~said~~ ^{the} insert in the circumferential direction finds its limit at the abutment 41 of the circumferential wall 11 of the disintegrator roll housing 1. Between these two points, the position of the contamination separation opening 4, as well as its size can be practically optionally determined, that is, made to conform to the existing requirements of spinning-technology.

Fig. 2 shows a top view of the insert 5 of Fig. 1 in a view marked by arrow D of Fig. 1. When seen in axial direction, it is obvious from Fig. 2, that the insert 5 possesses both the lateral limitation 12 as well as the opposite limitation 13 of the contamination

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separation opening 4. Consideration can also be given to the fact, that the one lateral limitation 12 could be a part of the side wall 18 (see Fig. 1) of the disintegrator roll housing 1. A formation of this kind, however, would sharply restrict the flexibility of the insert 5.

The lateral limitations 12 and 13 of the contamination separation opening 4 form together a part of the circumferential wall 11 of the disintegrator roll housing 1. With this arrangement, even in the position of the contamination separation ^{opening} area 4, the edge of the disintegrating roll is covered by the circumferential wall 11, and thereby, only the circumference of the disintegrator roll, which is supplied with an operative surface, lies opposite to the contamination separation opening 4. ^{In this manner,} thereby an improved air inlet in the area of the contamination separation opening 4 is attained, so that contamination can be better separated out and the area of the edge of the disintegrator roll can be kept free of fiber accumulations.

In Fig. 2, (presented in dotted lines) is a presentation of the fastening means 6. The insert 5 can be secured to the side wall 18 of the disintegrator roll housing 1 with the aid of these fastening elements 6. On the left side of the insert, as shown in Fig 2, can be seen the contact surface 53 as well as the outside of the contamination separation wall 42. The limiting wall 43 is designated as an invisible edge by the use of the dotted lines 431. Fig. 2 further makes plain, that the location of the contamination separation opening 4 is more or less freely chosen on the ^{insert} 5 and likewise, the length of the contamination separation opening 4 in its circumferential direction ^{is more or less freely chosen}.

Fig. 3 shows a top view similar to Fig. 2 of an insert in accord with the invention, whereby, however, the ^{insert} 5 does not encompass the contamination separation 4 from all sides. The lateral limitations of the contamination separation 4 take from the insert 5 of Fig. 3 two forklike extensions 51, which carry on their ends contact surfaces 53, ^{with} against which the ^{insert} 5 strikes on the abutment 41 (see Fig. 1) of the circumferential wall 11. The fastening (not shown) of the insert 5 of Fig. 3 is carried out in the same manner as in insert 5 of Figs. 1 and 2.

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With the embodiment of the insert 5 as it is shown in Fig. 3, the size of the contaminant separation opening is likewise determined. However, its exact position, in particular its position in the circumferential direction, is not exactly optional, since the one limitation of the contaminant separation opening 4 is fixed by means of the abutment 41 of the circumferential wall 11 of the disintegrator roll housing 1. In many insert cases, however, the residual advantages of the formation of the invented insert 5 in accord with Fig. 3 are fully sufficient, and permit an advantageous suitability and shaping of the contaminant separation opening 4 of the disintegrator roll housing 1. Especially where the modernization of the disintegration apparatuses of the machines of the state of the technology is concerned, this embodiment permits a cost(favorable) and rapid modernization even on machines, which cannot tolerate a stillstand of long duration. In that case, the segment, which forms the circumferential wall of the disintegrator roll housing 1 between the fiber feed opening 2 and the contaminant separation opening 4 is removed and replaced by the insert 5.

In order that the intake flow of air in the area of the contaminant separation opening 4 can be held free of turbulence, the edges 52 of the projections 51 of the insert 5 are designed to be rounded off. This (advantageous) formation is also of advantage when applied to the insert 5 in accord with Fig. 2.

It will be appreciated by those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope of the invention. It is intended that the present invention include such modifications and variations as come within the scope of the appended claims and their equivalents.

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Claims

Claimed is:

1. A disintegrator roll housing (1) of a disintegrator apparatus of an open-end spinning apparatus with a feed opening (2) for the addition of fiber bands, with an exit opening (3) for the removal of fibers from the said disintegrator roll housing (1) and having a contaminant separation opening (4) in the circumferential wall (11) of the disintegrator roll housing (1), whereby in the area in the direction of rotation of the disintegrating roll after the feed opening (2) an insert (5) is placed, which at least partially forms the circumferential wall (11) of the disintegrator roll housing (1),
therein characterized, in that the insert (5) ^{An} ~~extends~~ itself up to the area of the contaminant separation opening (4) of the disintegrator roll housing (1), and when seen in the axial direction, in relation to the disintegrating roll, ^{the insert} ~~forms~~ at least partially the circumferential wall (11) of the disintegrator roll housing (1) in the area of the contamination separation opening (4).
2. A disintegrator roll housing in accord with claim 1, therein characterized, in that in the direction of fiber transport, after the contaminant separation opening (4) an abutment (41) for the insert (5) is provided.
3. A disintegrator roll housing in accord with claim 1 or 2, therein characterized, in that the disintegrator roll housing (1) in the area of the contaminant separation opening (4) includes the lateral limitation (12) of the said contaminant separation opening (4), while the opposite lateral limitation (13) contains the insert (5).
4. An insert for a disintegrator roll housing (1) in accord with one or more of the claims 1 to 3, therein characterized, in that the insert (5) possesses at least one projection (51), which forms the circumferential wall (11) of the disintegrator roll housing (1) in the area of the contaminant separation opening (4).

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5. An insert for a disintegrator roll housing (1) in accord with claim 4, therein characterized, in that the insert (5) is of a forked design.
6. An insert in accord with claims 4 and 5, therein characterized, in that the insert (5) forms the restricting borders of the contamination separation opening (4) on at least two sides.
7. An insert for a disintegrator roll housing (1) in accord with one or more of the claims 4 to 6, therein characterized, in that the insert (5) contains the contaminant separation opening.
8. An insert in accord with one or more of the claims 4 to 7, therein characterized, in that the insert (5) has rounded off edges (52) for the improvement of the air flow in the area of the contamination separation opening (4).
9. An insert in accord with one of more of the claims 4 to 8, therein characterized, in that the insert (5) is exchangeably placed on the disintegrator roll housing (1).
10. An insert in accord with one of more of the claims 4 to 9, therein characterized, in that the insert (5) has one or more fastening means (6).
11. An insert in accord with one or more of the claims 4 to 10, therein characterized, in that the insert (5) possesses on its projection (51) one contact surface (53) with which the said insert (5) abuts the circumferential wall (11) of the disintegrator roll housing (1) at a location following the contamination separation opening.
12. An insert in accord with one or more of the claims 4 to 11, therein characterized, in that the insert (5) contains at least a part of the circumferential wall (11) following the contamination separation opening (4).

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13. A insert in accord with claim 12, therein characterized, in that the contamination separation opening wall (42), which follows the contamination separation opening (4) in the fiber transport direction, is integral with the insert (5).
14. An insert in accord with one or more of the claims 4 to 13, therein characterized, in that the insert (5) possesses a fiber band support, for that fiber band which is being fed into the feed opening (2) in the disintegrator roll housing (1).
15. A procedure for the modernization of an open-end spinning apparatus with a disintegrating apparatus, which includes a disintegrator roll housing, whereby the said disintegrator roll housing possesses a fiber feed opening for the feed of a fiber band, an exit opening for the removal of the fibers from the disintegrating roll housing, as well as a contaminant separation opening in the circumferential wall, whereby in the direction of rotation of the disintegrator roll after the band feed opening, a segment is placed, which extends itself to the contaminant separation opening, therein characterized, in that the segment can be removed and subsequently replaced by means of an insert with the features of one or more of the claims 4 to 13.

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ABSTRACT

Summary

An exchangeable ^{insert} ~~insert~~ (5) is proposed as auxiliary equipment for a housing (1) of a disintegrating apparatus of an open-end spinning apparatus. The said ^{an} ~~insert~~ (5) is so adaptable, that the disintegrator roll housing (1) can be made to conform to various spinning conditions. In a partial zone, in accord with this proposition, the ^{insert} ~~insert~~ (5) replaces a circumferential wall (11) of the disintegrator roll housing (1), wherein the ^{insert} ~~insert~~ (5) extends itself into to a zone of a contamination separation opening (4) of the said disintegrator roll housing (1). Its extension in the axial direction is so chosen, that it, at least partially, forms a portion of the circumferential wall (11) of the disintegrator (1) in the area of the ~~said~~ contamination separation opening (4).